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THE STRAW ITCH (DERMATITIS SCHAMBERGI): A DISEASE NEW TO AMERICAN PHYSICIANS.

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INTRODUCTION.

Investigations carried on within the last year have demonstrated the occurrence within the United States of a peculiar itching eruptive disease which has been proven to be due to the attack of a small straw and grain infesting mite. It has been shown that the presence of the mite in the straw or grain is dependent on the occurrence in the straw or the grain of certain insect parasites upon which the mite preys. To the farmer this mite is ordinarily beneficial in that by preying on the insect parasites of wheat the damage to his crops by these is minimized. When, however, the mite becomes excessively abundant it will, when the opportunity presents, attack not only the laborer in the field or the thrasher in the barn, but also the unsuspecting dweller in some distant city who tries to sleep on the straw which he has perhaps purchased in the form of a straw mattress. Because of the wide variety of uses to which straw is put, the distribution of the mite and the dermatitis that it may cause are very extensive and are therefore of great practical importance, not only to the farmer but to the physician and sanitarian.

In recognition of this, Prof. F. M. Webster, who is in charge of cereal and forage insect investigations of the Bureau of Entomology, has written a very comprehensive brochure treating of the subject, however, more particularly from the standpoint of the entomologist and for the farmer. As the matter is new to the physicians of the United States, and there is reason to believe that the depredations of the mite are likely to be increasingly conspicuous this spring and summer and probably for years to come, it seems desirable to present to the attention of physicians and sanitarians a brief summary of the knowledge of the subject.

THE DISEASE.

Synonyms.—*Urticarioid dermatitis* (Goldberger and Schamberg, 1909); *Dermatitis ditropenotus aureoviridis* (Rawles, 1909); *Straw itch* (Rawles, 1909); *Acaro-dermatitis urticarioides* (Schamberg, 1910); *Grain itch* (Schamberg, 1910); *Schamberg's disease*; *Straw-mattress disease* (in Philadelphia).

History and etiology.—The occurrence of a disease similar to the one under discussion has several times been recorded in the European medical press in the course of the last fifty or sixty years, and its association with a mite noted. In the United States, however, the disease was not recognized until 1901, when it was briefly described by Schamberg^a without, however, recognizing its etiology. This remained obscure until 1909, when the writer^b in cooperation with Professor Schamberg, while investigating an epidemic of apparently the same disease, demonstrated experimentally the etiologic rôle of a small, almost microscopic, straw-infesting mite, very close to if not identical with *Pediculoides ventricosus*.^c

The paper reporting this investigation and the press notices that the investigation received brought the writer communications from New Jersey, Maryland, Pennsylvania, Ohio, and Indiana, indicating the occurrence during the same or previous seasons of a similar if not identical itching eruptive disease in various localities in these States. In Huntertown, Ind., and vicinity an outbreak of an eruptive disease identical with that reported by Schamberg and myself was carefully studied by Dr. Lyman T. Rawles, who published his observations in August, 1909, in the Journal of the Indiana State Medical Association.

Following the appearance of the paper by Goldberger and Schamberg, Prof. F. M. Webster^d of the Bureau of Entomology, took up the subject with the view of determining the cause of the presence of the mite in the straw. Professor Webster's experience and previous studies in this special field at once led him to suspect—and his investigation soon confirmed this suspicion—that the presence of this mite is dependent on the presence in the straw or grain of the host insect on which it preys. In nature the mite attacks and feeds on the soft-bodied larvae or adults of any one of several species of insects, some of which, such as the wheat-straw worm (*Isosoma grande* Riley), the joint worm (*Isosoma tritici* Fitch), and the Angoumois grain moth (*Sitotroga cerealella*), attack the stems and the grain of wheat. Accordingly its distribution is at least coextensive with the distribution of these insect parasites of the wheat, which is equivalent to saying that it is at least coextensive with the wheat-growing area of the United States (and of the world).

Now, when it is recalled that the wheat straw does not all remain to be consumed where it is grown, but, on the contrary, is shipped considerable distances to supply the various demands of industry and manufacture, it can be readily understood that there is hardly any geographical limit to the distribution of the mite or of the dermatitis which its attack on man may induce, and it may therefore present itself for diagnosis not only to the rural practitioner, but also to his urban brother.

The mite, the results of the activities of which are under discussion, is an acarine belonging to the family *Tarsonemidæ*, and known as

^a Schamberg, Jay F.; An epidemic of a peculiar and unfamiliar disease of the skin; Phila. Med. Journ., July 6, 1901.

^b Goldberger, Joseph, and Schamberg, Jay F.; Epidemic of an urticarioid dermatitis due to a small mite (*Pediculoides ventricosus*) in the straw of mattresses, Public Health Reports, Washington, 1909, July 9, Vol. XXIV. No. 28.

^c Should not be confused with *Pediculus vestimenti*, the body louse.

^d Webster, F. M., A predaceous mite proves noxious to man; Circular No. 118, Bureau of Entomology, April 23, 1910.

Pediculoides ventricosus (figs. 1 and 2). It is kin to the better known trombidids, or "harvest mites," certain larval forms of which, popularly known as the "red bug" (fig. 3) (*Leptus autumnalis*) may also attack man, also to the itch mite, *Sarcoptes scabiei* (figs. 4 and 5), of the family *Sarcoptidae*, and more distantly to the ticks, which are acarines belonging to the group *Ixodoidea*.

The young adult, *P. ventricosus*, is almost microscopic in size; the male remains small, but the female when pregnant, develops a relatively enormously distended abdomen. The gravid female therefore has the appearance of a yellowish-white globular body not unlike a minute egg. The swelling of the abdomen is due to the development within it of large numbers of young, which emerge sexually mature and with the four pairs of limbs characteristic of adult acarines fully developed. The new generation consists almost entirely of females, and it is these young females that do the damage under discussion.

The development of the eggs in the pregnant female is of course dependent on temperature. During the cold weather they remain dormant, but in spring, with the return of warm weather, the development proceeds and the mites begin to multiply both in the stubble in the fields and in the stored straw or grain. When their food supply is abundant, that is, when the wheat, stalk or grain, is excessively parasitized, the mites may literally swarm, and in the summer may seriously interfere with the harvesting or thrashing, and, in the succeeding spring, with the handling of the grain or the customary uses of the straw. When persons (and probably also animals) come in contact with such infested straw or grain, whether in the field or in the barn or storehouse, or whether as packing stuff or in mattresses, provided the weather is sufficiently warm, they are attacked by the swarming voracious mites. These attach themselves to skin by means of the sucking disks and claws with which the feet are provided, and while attempting to obtain nutriment inject into the skin some irritating poisonous substance resulting in the production of local and sometimes constitutional symptoms.

Symptoms.—Within twelve to sixteen hours after exposure the first and invariable symptom, itching, appears; in severe cases, and especially where the cause is not suspected or recognized and the

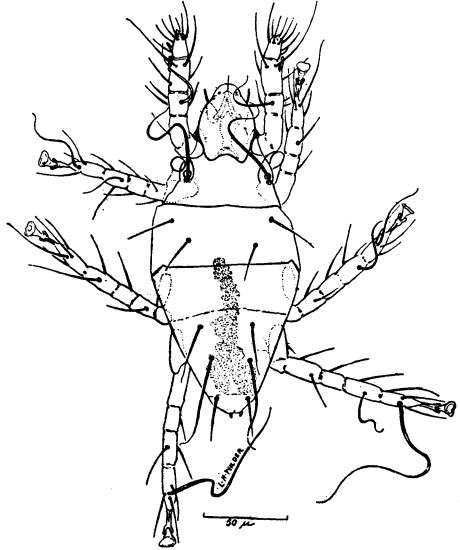


FIG. 1.—*Pediculoides ventricosus*. Young female isolated from siftings of a straw mattress. Enlarged. Original.

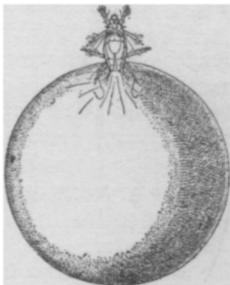


FIG. 2.—*Pediculoides ventricosus*. Gravid female. Enlarged. (After Banks, 1904.)

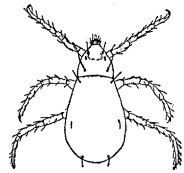


FIG. 3.—A "harvest mite" or "red bug." The larvæ (*Leptus*) of a trombidium. Enlarged. (After Banks, 1904.)

exposure is continued night after night by sleeping on an infested straw mattress, for example, the itching may become almost intolerable. The eruption appears simultaneously with the itching, and characteristically consists of wheals surmounted by a vesicle (figs. 6 and 7). The vesicle as a rule does not exceed a pin head in size, but it may become as large as a lentil seed or pea. Its contents very rapidly become turbid, and the vesicle is converted in a few hours into a pustule. Instead of frank wheals there may be erythemato- or papulo-urticarial lesions. The lesions are irregularly circular or oval in outline, from a lentil to a finger nail in size, and usually of a warm rose tint. The pinkish-white anemic area of ordinary "hives" is rare. The eruption is most abundant on the trunk, slight on the face

and extremities, and practically absent from the feet and the hands. Even when experimentally exposed to attack, the limbs, for some reason, largely or altogether escape. The onset in severe cases may be marked by chilliness, nausea, and vomiting, followed for a few days by a slight elevation of temperature with the appearance of albumin in the urine. In the less severe types there may be only some diminution of appetite and malaise, or, finally, a constitutional reaction may be altogether absent.

The mite, as has already been stated, attaches itself to the skin of its host, but is easily brushed off or crushed. Accordingly, the symptoms rapidly subside, and all signs of the eruption will have faded away in a week or ten days, even without treatment, after contact with the infested grain or straw is discontinued. Where, however, the cause is not recognized, the patient will continue to suffer in spite of all treatment until the mites have all hatched out and have died, a period of from three to seven weeks in Schamberg's ^a experience.

Diagnosis.—The peculiarities of the eruption above described are sufficiently characteristic for its recognition. A history of contact with grain or straw or the use of a new straw mat-

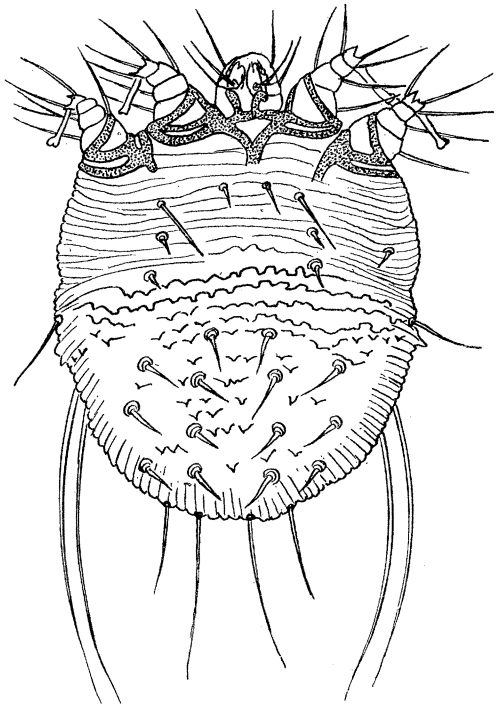


FIG. 4.—The "itch" mite, *Sarcoptes scabiei*. Female, dorsal aspect. 200/l. (From Braun, after Fuerstenberg.)

^a Schamberg, Jay Frank; Grainitch (*Acaro-dermatitis urticarioides*); A study of a new disease in this country: Journ. Cutaneous Dis., February, 1910.

trass is always obtainable and confirms the diagnosis. The lesion should be scraped and the scrapings examined under the lower powers of the microscope. This may disclose the presence of the mite and so clinch the diagnosis. As, however, *P. ventricosus* does not burrow and is likely to be brushed off by the friction of the clothes, examination of the scrapings may be negative.

It seems almost certain that this disease has for many years escaped recognition because of its confusion with "chiggers," scabies, and the common "hives." "Chiggers"^a is the vernacular name for the itching eruption induced by the attack of the "red bug," the larval form of some one of several species of Trombidiids or "harvest mites" of the genus *Leptus*. These larval mites tend to bore into the skin, and because of their red color and size can be detected by the naked eye in the lesion or scrapings. There should therefore be no difficulty in making the distinction.

The differentiation from the "itch" or scabies can be made clinically by attention to the history and to the character and distribution of the lesions. The itch mite burrows in the skin, and even to the untrained eye differs markedly from *P. ventricosus* in appearance.

The lesion of urticaria, ordinary "hives," is without the central vesicle or pustule. This alone is sufficiently distinctive to prevent confusion.

Difficulties of diagnosis from chicken pox or smallpox may occasionally arise. Attention, however, to the history, the character of the onset, and to the character and distribution of the eruption should make the distinction clear. Practically, because of ignorance of the disease or from interested motives, there is probably more danger of mistaking smallpox for this dermatitis. Proper consideration of the points above set forth should leave no excuse for this dangerous blunder.

Treatment.—As has already been indicated, the *P. ventricosus* does not bore into the skin. Its attachment to the surface being feeble, it is readily brushed off by the friction of the clothes; local antiparasitic treatment is therefore hardly necessary. If desired, however, a mild sulphur ointment will answer this purpose. Antipruritic treat-

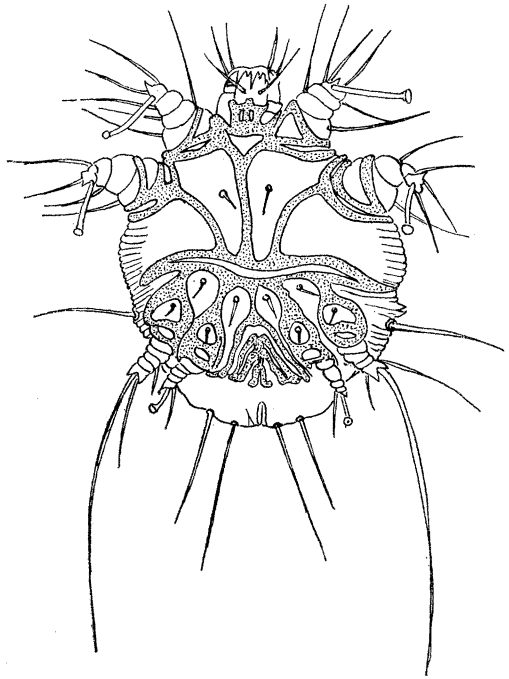


Fig. 5.—The "itch" mite, *Sarcoptes scabiei*. Male, ventral aspect. 200/1. (From Braun, after Fuerstenberg.)

^a This name is applied also in tropical countries to the condition induced by the attack of the sand flea, *Sarcopsylla penetrans*.

ment is always called for; warm, mildly alkaline baths or some simple soothing ointment, such as zinc oxide, will be found to fulfill this indication. Of course, contact with the suspected straw or grain must be discontinued. The clothes and body linen must be changed, but as Mr. V. L. Wildermuth^a has shown that the mite can not survive more than a day without food, airing them for a day or so will be sufficient to free them from danger.

Prevention.—The measures in which the sanitarian is primarily interested relate to the destruction of the mite and the prevention of the trouble produced by it. These measures may be grouped under two heads, immediate and remote. Under the former may be considered insecticides, such as heat and fumigation with sulphur or formaldehyde. Advantage may be taken of some of the cited facts in the life history of the mite to destroy it by starvation. This may be accomplished by storing the straw or grain at summer temperature, or its practical equivalent, sunning and airing during summer weather. In this way rapid multiplication of the mite and development to maturity and escape of the insects on which it preys are promoted, with a consequent rapid exhaustion of its food supply, and thus its eventual rapid starvation and destruction. These measures are applicable, of course, only to the harvested wheat (straw or grain). To the farmer and farm laborer they are of only secondary importance; these wish to know primarily how they may protect themselves when harvesting the crop and secondarily how they may protect the purchaser of the grain or straw. When there is reason to suspect that the wheat is infested, the farm laborer when harvesting or threshing may protect himself to some degree at least, it appears to me, by anointing his body freely with some bland oil or grease, followed by a change of clothes and a bath as soon as his work is done. This, however, does not go to the root of the problem. We are therefore brought to a consideration of the remote measures aimed at the destruction of the mite. These are really the more fundamental and the more important. They have in view the diminution in the numbers of the insect parasites of the wheat, the prey of the mite, on the presence of which the presence of the mite itself is dependent.

The work of Professor Webster indicated that these measures would demand certain changes in agricultural methods. It is not my purpose to discuss these, preferring to refer those who are interested in this important phase of the subject to Professor Webster's brochure already cited, which may be obtained free on application to the United States Bureau of Entomology, Washington, D. C.

^aSee Webster, F. M., *supra*, p. 23.

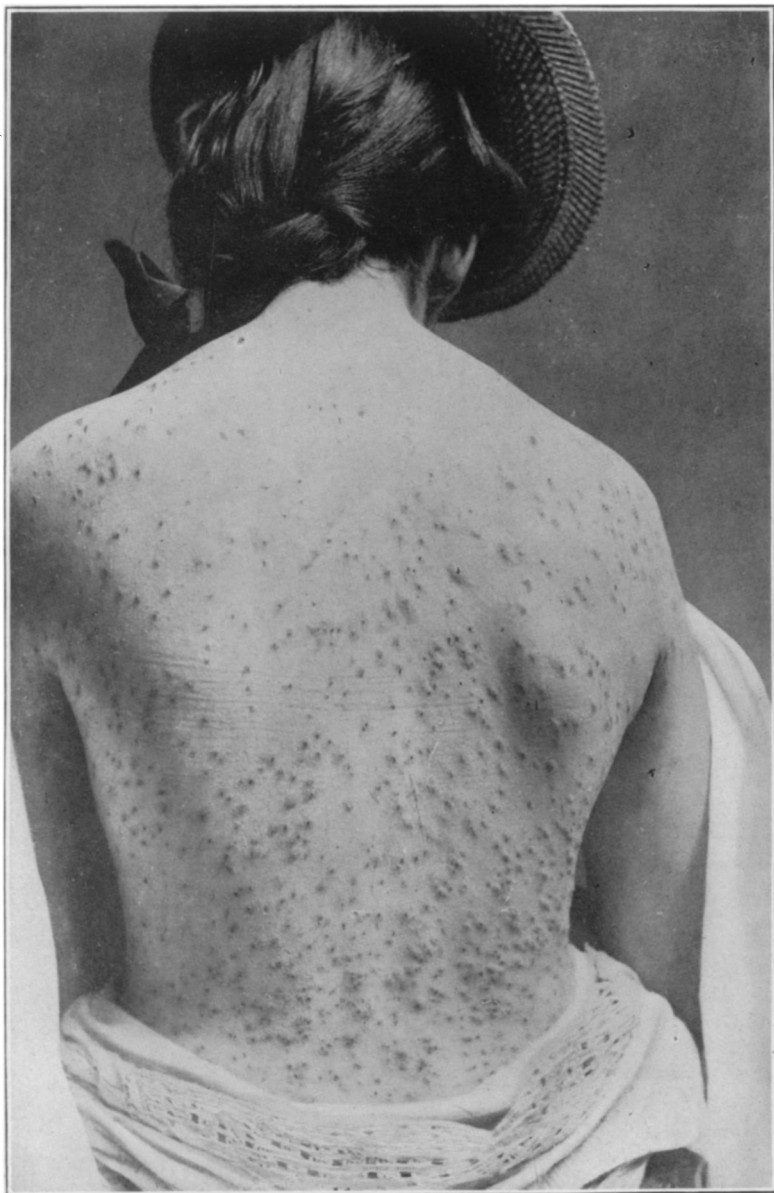


FIG. 6.—DERMATITIS SCHAMBERGI. VESICULO-PUSTULOSA TYPE.
(After a photograph by Schamberg.)



FIG. 7.—DERMATITIS SCHAMBERGI. TYPE SIMULATING VARICELLA.

(After a photograph by Schamberg.)